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A THERAPEUTIC APPARATUS AND A METHOD OF TREATMENT USING  
THE APPARATUS

**Technical Field**

5           This invention relates to a therapeutic apparatus and  
a method of treatment using the apparatus.

**Background to the Invention**

          The lymphatic system is an extensive drainage system  
10   that transports water and molecules from tissue to the  
bloodstream in a liquid known as lymph. The lymph flows  
from the tissue to the blood stream via a network of  
lymphatic vessels that return the lymph to the bloodstream  
via a large vein that is located in the upper chest (near  
15   the neck). One of the major lymphatic vessels is the  
thoracic duct which receives lymph from the pelvis, lower  
limbs, abdomen, and lower chest and returns the lymph to  
the bloodstream via a large vein in the upper chest.

          In addition to returning water and molecules to the  
20   bloodstream, the lymphatic system also serves to filter  
out foreign materials such as microorganisms and toxins.  
This filtering process is carried out by lymph nodes which  
lie along the network of lymphatic vessels. Lymph nodes  
are swollen nodes along the lymphatic vessels which consist  
25   of a fine network of tissue that contains macrophage.  
Microorganisms and toxins that are contained in the lymph  
are trapped as the lymph passes through the lymph node and  
subsequently phagocytised by the macrophages to thereby  
remove the foreign material and toxins from the lymph  
30   prior to re-entry of the lymph into the bloodstream.

          The amount of toxins that remain in the lymph  
following processing in the lymph nodes is generally  
greatly reduced if not eliminated. Following entry of the

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lymph into the bloodstream, removal of the remaining toxins is completed mainly by the liver and kidney and through the skin.

Under some circumstances, however, the lymph nodes  
5 may be overwhelmed with microorganisms and/or toxins, resulting in accumulation of toxins in the lymph nodes and lymphatic system. This reduces the effectiveness of the lymph nodes and can lead to further accumulation of toxins, resulting in low energy levels, fatigue, general  
10 malaise, muscle pain, poor mental state, poor skin tone, insomnia or restless sleep.

It has been tried to assist in the expulsion of these toxins from the body by performing a lymphatic drainage massage. In such a massage, a skilled masseur manipulates  
15 a person at regions of their body associated with the lymph system to mobilise the contents of the lymph system to encourage drainage into the blood system and subsequent processing by the liver. Such a massage can be time consuming and requires a skilled masseur.

20 Further, subjects have reported that following such a massage they often feel very unwell. This is thought to be due to the increased level of toxins in the blood due to the mobilisation of the lymph fluid caused by the massage.

25

### **Summary of the Invention**

In a first aspect the present invention provides a therapeutic apparatus including: a tank arranged to hold a body of fluid being sufficiently deep to submerge an  
30 upright person at least up to their neck; means for agitating the fluid to effect a perturbation massage upon a person submerged in the fluid to mobilise toxins in the person's lymph system.

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When submerged in the tank, the person is subjected to a perturbation massage caused by the agitation of the fluid. This mobilises substances in the lymph system of the person. Further, there is a pressure gradient in the tank due to the weight of the fluid. The pressure is greatest at the bottom of the tank and decreases upwardly to atmospheric pressure at the surface of the fluid at a point near to the neck of the person. This pressure gradient naturally urges lymphatic fluid upwards in the body towards the neck. Fluid in the head area drains downwardly under the force of gravity. Lymph from the lower periphery and trunk drains into the lymphatic duct from which the lymph drains into the blood system at the base of the left subclavian vein at the junction of the left subclavian and internal jugular veins. The combined effect of the pressure gradient in the tank and the mobilisation of lymph fluid assists in lymphatic drainage. This lymphatic drainage is achieved without the need to employ a skilled masseur.

The body of fluid and the fluid may have a density greater than water. This provides a greater pressure gradient in the tank and increases the tendency for lymph fluid to drain upwardly.

The fluid may be a mixture of water and a salt. The salt may include a salt of magnesium such as magnesium sulphate.

The means for agitating may include a pump and an arrangement of nozzles for delivering jets of pressurised fluid. The nozzles may be arranged to rotate.

The apparatus may further include means to maintain the person in the submerged position such as a system of weights or tethers. This is because the buoyancy of the person may need to be counteracted to maintain them in a

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submerged position about up to their neck. This is particularly the case where a fluid that is more dense than water is utilised.

In a second aspect the present invention provides a method of effecting lymphatic drainage in a person including the steps of: submerging the person in a body of fluid up to about their neck and in a substantially vertical orientation; and agitating the fluid to effect a perturbation massage upon the person submerged in the fluid to mobilise toxins in the person's lymphatic system.

In a third aspect the present invention provides a therapeutic method including the steps of: submerging the person in a body of fluid up to about their neck and in a substantially vertical orientation; and agitating the fluid to effect a perturbation massage upon the person submerged in the fluid.

In a fourth aspect the present invention provides a method of treating a condition in a person comprising the steps of: submerging the person in a body of fluid up to about their neck and in a substantially vertical orientation; and agitating the fluid to effect a perturbation massage upon the person submerged in the fluid to mobilise toxins in the person's lymphatic system.

The mobilised toxins are carried by the draining lymph into the person's blood stream from where the toxins can be removed from the person's body through organs such as the liver, kidney and skin.

Mobilised toxins may be removed from the person's bloodstream via the skin through perspiration. Thus, the method may further comprise the step of elevating the body temperature of the person to thereby cause the person to perspire. The body temperature may be elevated while the

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person is submerged in the fluid, or subsequent to removal of the person from the fluid.

The body temperature of the person may be elevated by any means that causes the person to perspire. The body  
5 temperature may be elevated by exposing the person to an amount of infra-red radiation that is sufficient to cause the person to perspire. The person may be exposed to infra-red radiation in an infra-red sauna. The infra-red sauna may be a far infra-red sauna. The far infra-red  
10 sauna may be operated at a temperature of between 50° and 70°.

The body temperature of the person may be elevated by elevating the temperature of the fluid in which the person is submerged to a temperature that causes the person to  
15 perspire.

The condition may be a condition that results from toxins in the lymphatic system of the person. Without wishing to be bound by theory, the inventor believes that some conditions result from toxins in the lymphatic system  
20 of a person, and that a method which effects lymphatic drainage may be used to treat such conditions. The condition may be associated with one or more of the following: low energy levels, fatigue, general malaise, muscle pain, poor mental state, poor skin tone, insomnia  
25 or restless sleep.

The condition may result from exposure to toxins from the environment. Toxins from the environment may include, for example, pesticides such as organophosphates, organochlorines, carbamates, pyrethrums, herbicides,  
30 insecticides, plastics such as formaldehyde, phenol, phthalates, vinyl chloride, dioxins, bisphenol A, PBDE's, toxic metals such as aluminium, arsenic, lead, mercury, organic pollutants such as PCB's, dioxins, furans, PCBD's,

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trichloromethane, organochlorine pesticides, cosmetics and perfumes such as acetone, benzaldehyde, ethanol, phthalates, lead, paints constituents such as benzene, diisocyanates, toluene, trichloroethane, xylene, inorganic compounds such as flourides, nitrates/nitrites, nitrogen dioxide, sulphur dioxide, ozone, phosphates, sodium hypochlorite, sulphites, ink constituents such as benzene, formaldehyde, phenol, petrol constituents such as benzene, ethylene dibromide, hexanes, toluene, trimethylpentane, xylene, MTBT, food and drug preservatives such as butylated hydroxyl anisole, butylated hydroxytoluene, nitrites, sulfites, thimersol, food contaminants such as lipid peroxidase, trans fatty acids, acrylamides, polycyclic aromatic hydrocarbons, mycotoxins, fungicides, herbicides, insecticides, antibiotics, hormones, mercury, lead, cadmium, water contaminants such as trichloromethanes, arsenic, flouride, aluminium, lead, nitrates, volatile organic compounds, cleaning compounds such as ethylene dichloride, tetrachhloroethylene, trichloroethylene, trichloroethane, ammonia, enzymes, formaldehyde, perfume, phenol, phosphate, sodium hypochlorite, combustion products such as carbon dioxide, carbon monoxide, tars, hydrocarbons, ash/soot, carpet and furniture constituents such as butylated hydroxytoluene, formaldehyde, isooctane, phencyclohexane, propanediol, styrene, vinyl acetate, polybrominated diethyl ether (PBDE's), alcohols such as ethyl, methyl, isopropyl alcohols, propylene glycol, glycerol, adhesives such as butadiene diisocyanates, formaldehyde, styrene, toluene, fragments of organisms such as bacteria, viruses, fungi, protozoans, molecules, allergens, etc that have been partially degraded by the immune system.

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The condition may result from accumulation of toxins from drug use. It is envisaged that the use of a drug will result in accumulation of the drug, or a metabolite of the drug, in the lymphatic system, and that the method  
5 will therefore be of some benefit to conditions resulting from drug use. For example, drug use may be chemotherapy for the treatment of diseases such as cancer or infectious disease, for pain management therapies such as use of morphine, or for chronic disease therapies such as use of  
10 insulin for diabetes.

The condition may result from accumulation of toxins from normal metabolism. For example, free radicals, ammonia, hydrogen sulfide, methane, butane, cadaverine, putrescine and other toxic molecules can accumulate over  
15 time in the lymphatic system as a result of immune system activity and general metabolism.

The condition may be lethargy, fatigue, malaise, weakness, arthralgia, myalgia, insomnia, sleep disturbance, sinus congestion, chest congestion, poor  
20 immunity (which can result in, for example, increased incidence of viral and bacterial infections, recurrent Herpes "cold sores" or genital herpes, recurrent mouth ulcers), cognitive dysfunction such as poor concentration, impaired memory, mental vagueness, confusion, and learning  
25 difficulties, mood disorders such as mood swings, anxiety, irritability, depression, lack of motivation, loss of libido, Skin rashes and acne, fluid retention, headaches, tachycardia and ectopics.

The condition may be a condition selected from the  
30 group consisting of gulf war syndrome, diabetes, Cancer, heart failure, kidney failure, liver failure, chronic auto-immune conditions, lupus, rheumatoid arthritis, Crohn's disease, ulcerative colitis, emphysema, chronic

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viral illnesses such as Hepatitis C and HIV, chronic substance abuse such as alcohol, tobacco and/or recreational drug abuse, dysbiosis, Leaky gut syndrome, chronic fatigue syndrome, fibromyalgia, recurrent  
5 infections, detoxification of toxic drug metabolites from prescription medication, chemotherapy drugs, etc.

### **Brief Description of the Drawings**

An embodiment of the present invention will now be  
10 described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a cross sectional view of an embodiment of a therapeutic apparatus according to the present invention;

15 Figure 2 is a perspective view of the tank of the apparatus of figure 1 illustrating the layout of nozzles; and

Figures 3 and 4 are cut away views showing a person submerged in the tank of Figure 1 up to about their neck.

20

### **Detailed Description of the Preferred Embodiment**

Referring to Figure 1, a therapeutic apparatus 10 is shown including a tank 12 being the inner wall of moulded fibreglass unit 13. Tank 12 holds a body of fluid in the  
25 form of a hyperosmolar solution 14 being a solution of magnesium sulphate in water. The solution has a specific gravity of around 1.3-1.4.

Apparatus 10 includes means for agitating the fluid being a combination of a pump and rotating spa jet nozzles  
30 16. The pump is mounted in machinery housing area 18 which also houses a heater, a filter unit, an ozone generator and a high pressure air pump which also delivers air to the spa jet nozzles 16. The pump acts to expel



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fluid 14 through nozzles 16. Overflow inlet 20 channels  
overflow fluid back to the pump. Fluid 14 is continuously  
recirculated through the pump and is maintained at about  
32-34 degrees celsius. Spa nozzles 16 are connected to  
5 the air pump via a one-way valve to stop fluid 14 from  
entering the air pump. Tank 12 is about 2m deep and 1.2m  
in diameter.

Referring to Figure 2, spa nozzles 16 are shown in a  
concentric staggered arrangement.

10 Referring to Figure 3, a person 22 is shown submerged  
in fluid 14 up to about their neck. Weights 24 are  
attached to the person to maintain them submerged in the  
high density fluid. About 30lbs of weights are required  
for an adult, depending upon their weight.

15 Referring to Figure 4, an alternative arrangement to  
Figure 3 is shown. Tether cord 26 passes through a loop  
28 fixed to the bottom of tank 12 and is attached to the  
ankles of the person. By pulling upwards on cord 26, the  
person is maintained submerged in fluid 14. Weights 24  
20 maintain the arms of person 22 submerged. A clamp 30  
retains tether cord 26 in the correct position.  
Alternatively, the person 22 can hold onto cord 26 to keep  
themselves in the correct position.

The person enters tank 12 from a platform (not shown)  
25 level with the top of the tank.

### **Example**

A pilot study was conducted to determine whether therapy  
in the apparatus, combined with far infra-red sauna  
30 therapy, led to significant improvements in the energy  
levels and sense of well-being of participants.

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Fifteen study participants were recruited through general practitioners and local newspaper advertising. All participants were female, aged between 29 and 54 years of age. All participants were experiencing current health issues of low energy, fatigue or malaise that was significantly affecting their quality of life and performance of their normal daily activities. The study was conducted over a 6 week period as follows:

Week 1-2	Baseline control - No treatment Survey monitoring
Week 3-4	5 combined therapy sessions per week (20 minutes treatment in apparatus + 20 minutes Far infra-red therapy) Survey monitoring
Week 5-6	No treatment Survey monitoring

10

The participants completed ten questionnaires over a 6 week period to establish the three phases for the study: two at baseline (week 1 and 2) before the participants commenced treatment, 6 during the two week course of the ten treatments (weeks 3-4), and two at post-treatment (weeks 5-6).

The questionnaire was based on three broad components:

(a) the CDC healthy days instrument from the US Centres for Disease Control (Measuring Healthy Days, Population Assessment of Health Related Quality of Life, US Department of Health and Human Services, Center for Disease Control and Prevention, Atlanta Georgia, November 2000);

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- (b) a set of questions relating to health impairments and energy levels; and
- (c) the full SF-36 Health Survey (Short-form 36 questions developed by John Ware (VP-004 available from Quality Metric Incorporated) that includes overlapping
- 5 domains for energy and vigour.

The CDC Healthy Days instrument and the SF-36 are well-known and universally recognised questionnaires for the assessment of fatigue.

10

Results:

The results of the questionnaires prior to treatment are summarised in Table 1.

15

Table 1: Baseline to week 4

<b>Section II</b> <b>Healthy Day Effect</b>	% of participants who experienced an improvement in the effect listed in the left hand column.	% of participants who experienced a deterioration in the effect listed in the left hand column.
Number of days lost due to poor physical health	46.7%	>50%
The number of days lost due to poor mental health	46.7%	7%
The number of days lost overall due to poor health state to do usual activities	46.7%	>50%

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<b>Section III</b>		
<b>Health Impairment Change</b>		
The self-reported number of health impairments suffered by participants	40%	20%
The sad/blue/depressed level in the previous 30 days	40%	20%
The number of days of feeling no energy in the previous 30 days	66.7%	0%
<b>Section IV</b>		
<b>Changes in fitness and energy levels</b>		
The ability to concentrate on daily tasks	60%	6.7%
Current overall levels of energy	46.7%	6.7%
<b>Section V</b>		
<b>Overall Health status and Quality of life</b> (Feelings experienced in previous 4 weeks)		
Physical and emotional health affecting interactions with the family	53.3%	6.7%
The feeling of calm and peacefulness experienced	46.7%	0%
The feeling of energy experienced	53.3%	6.7%
The feeling of experiencing the blues	46.7%	13.4%

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The feeling of being worn out	60%	6.7%
The feeling of being happy	46.7%	6.7%
The feeling of tiredness	46.7%	20%
The personal feeling of healthiness	40%	13.3%

The post-treatment monitoring for fourteen participants was conducted in weeks 5 & 6 of the study. The data were compared for fifty-four indicators in week 1 (baseline),  
 5 week 4 (week 2 of treatment) and week 6 (week 2 post-treatment) and summarised in Table 2.

Table 2: Post-treatment analysis from baseline to week 6

<b>Section II</b> <b>Healthy Day Effect</b>	% of participants who experienced an improvement in the effect listed in the left hand column.	% of participants who experienced a deterioration in the effect listed in the left hand column.
Number of days lost due to poor physical health	57.1%	7.1%
The number of days lost due to poor mental health	50%	0%
The number of days lost overall due to poor health state to do usual activities	50%	21.4%
<b>Section III</b>		

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<b>Health Impairment Change</b>		
The self-reported number of health impairments suffered by participants	42.9%	21.4%
The sad/blue/depressed level in the previous 30 days	50%	14.3%
The number of days of feeling no energy in the previous 30 days	50%	14.3%
<b>Section IV</b> <b>Changes in fitness and energy levels</b>		
The ability to concentrate on daily tasks	42.9%	7.1%
Current overall levels of energy	57.1%	7.1%
<b>Section V</b> <b>Overall Health status and Quality of life</b> (Feelings experienced in previous 4 weeks)		
Physical and emotional health affecting interactions with the family	71.4%	7.1%
The feeling of calm and peacefulness experienced	50%	0%
The feeling of energy experienced	71.4%	0%
The feeling of experiencing the blues	50%	7.1%

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The feeling of being worn out	64.3%	0%
The feeling of being happy	57.1%	7.1%
The feeling of tiredness	64.3%	7.1%
The personal feeling of healthiness	Not provided	Not provided
The body pain felt	57.1%	21.4%
The amount of pain felt affecting work	57.1%	14.3%
The feeling of being very nervous	57.1%	7.1%
The down-in-the-dumps feeling experienced	50%	0%
The amount of time physical and emotional problems has interfered with social activities	42.9%	21.4%

#### Conclusion:

5           The analysis showed there were a number of positive movements towards the desired outcomes on a number of key indicators within the group both in the treatment phase versus baseline and in the post-treatment comparison with baseline.

10           Any reference to prior art contained herein is not to be taken as an admission that the information is common general knowledge, unless otherwise indicated.

          Finally, it is to be appreciated that various alterations or additions may be made to the parts  
15   previously described without departing from the spirit or ambit of the present invention.

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## CLAIMS:

1. A therapeutic apparatus including:  
a tank arranged to hold a body of fluid being  
5 sufficiently deep to submerge an upright person at  
least up to their neck;  
means for agitating the fluid to effect a  
perturbation massage upon a person submerged in the  
fluid to mobilise toxins in the person's lymph  
10 system.
2. A therapeutic apparatus according to claim 1 further  
including a body of fluid wherein the fluid has a  
density greater than water.
3. A therapeutic apparatus according to claim 2 wherein  
15 the fluid is a mixture of water and a salt.
4. A therapeutic system according to claim 3 wherein the  
salt includes a salt of magnesium.
5. A therapeutic system according to any preceding claim  
wherein the means for agitating includes a pump.
- 20 6. A therapeutic system according to any preceding claim  
wherein the means for agitating further includes  
nozzles for delivering a jet of pressurised fluid.
7. A therapeutic apparatus according to claim 6 wherein  
the nozzles are arranged to rotate.
- 25 8. A therapeutic system according to any preceding claim  
further including means to maintain the person in the  
submerged position.
9. A therapeutic system according to claim 8 wherein the  
means to maintain the person in the submerged  
30 position includes a system of weights or tethers.
10. A method of effecting lymphatic drainage in a person  
including the steps of:  
submerging the person in a body of fluid up to about



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- their neck and in a substantially vertical orientation; and  
agitating the fluid to effect a perturbation massage upon the person submerged in the fluid to mobilise toxins in the person's lymph system.
- 5
11. A method according to claim 10 wherein the fluid has a density greater than water.
12. A method according to claim 11 wherein the fluid includes a mixture of water and a salt.
- 10 13. A method according to claim 12 wherein the salt includes a salt of magnesium.
14. A method according to any one of claims 10 to 13 wherein the step of agitating includes pumping the fluid.
- 15 15. A method according to any one of claims 10 to 14 wherein the step of agitating includes the step of delivering the fluid into the tank through nozzles for delivering a jet of pressurised fluid.
16. A method according to claim 15 wherein the nozzles are arranged to rotate.
- 20 17. A method according to any one of claims 10 to 16 wherein the person is maintained in the submerged position by a system of weights or tethers.
18. A therapeutic method including the steps of:
- 25 submerging the person in a body of fluid up to about their neck and in a substantially vertical orientation; and  
agitating the fluid to effect a perturbation massage upon the person submerged in the fluid.
- 30 19. A method according to claim 18 wherein the fluid has a density greater than water.
20. A method according to claim 19 wherein the fluid includes a mixture of water and a salt.

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21. A method according to claim 20 wherein the salt includes a salt of magnesium.
22. A method according to any one of claims 18 to 21 wherein the step of agitating includes pumping the fluid.
23. A method according to any one of claims 18 to 22 wherein the step of agitating includes the step of delivering the fluid into the tank through nozzles for delivering a jet of pressurised fluid.
24. A method according to claim 23 wherein the nozzles are arranged to rotate.
25. A method according to any one of claims 18 to 24 wherein the person is maintained in the submerged position by a system of weights or tethers.
26. A method of treating a condition in a person comprising the steps of: submerging the person in a body of fluid up to about their neck and in a substantially vertical orientation; and agitating the fluid to effect a perturbation massage upon the person submerged in the fluid to mobilise toxins in the person's lymphatic system.
27. A method according to claim 26 wherein the fluid has a density greater than water.
28. A method according to claim 27 wherein the fluid includes a mixture of water and a salt.
29. A method according to claim 27 wherein the salt includes a salt of magnesium.
30. A method according to any one of claims 26 to 29 wherein the step of agitating includes pumping the fluid.
31. A method according to any one of claims 26 to 30 wherein the step of agitating includes the step of

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delivering the fluid into the tank through nozzles for delivering a jet of pressurised fluid.

32. A method according to claim 31 wherein the nozzles are arranged to rotate.
- 5 33. A method according to any one of claims 26 to 32 wherein the person is maintained in the submerged position by a system of weights or tethers.
34. A method according to any one of claims 26 to 33 further comprising the step of elevating the body  
10 temperature of the person to thereby cause the person to perspire.
35. A method according to claim 34 wherein the body temperature is elevated subsequent to removal of the person from the fluid.
- 15 36. A method according to claim 34 or 35 wherein the body temperature is elevated by exposing the person to a dose of infra-red radiation that is sufficient to cause the person to perspire.
37. A method according claim 36 wherein the person is  
20 exposed to infra-red radiation in an infra-red sauna.
38. A method according to any one of claims 26 to 29 wherein the condition is associated with the accumulation of toxins in the lymphatic system of the person.
- 25 39. A method according to any one of claims 26 to 38 wherein the condition is selected from the group consisting of lethargy, fatigue, malaise, weakness, arthralgia, myalgia, insomnia, sleep disturbance, sinus congestion, chest congestion, poor immunity,  
30 cognitive dysfunction, learning difficulties, mood disorders, lack of motivation, loss of libido, Skin rashes, acne, fluid retention, headaches, tachycardia, ectopics, gulf war syndrome, diabetes,

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cancer, heart failure, kidney failure, liver failure,  
chronic auto-immune conditions, lupus, rheumatoid  
arthritis, Crohn's disease, ulcerative colitis,  
emphysema, Hepatitis C, HIV, chronic substance abuse,  
5 dysbiosis, Leaky gut syndrome, chronic fatigue  
syndrome, fibromyalgia, recurrent infections, and  
detoxification of toxic drug metabolites from  
prescription medication or chemotherapy drugs.

10 Dated this 24th day of February 2005

NUTRIPHARMA LTD

By their Patent Attorneys

GRIFFITH HACK

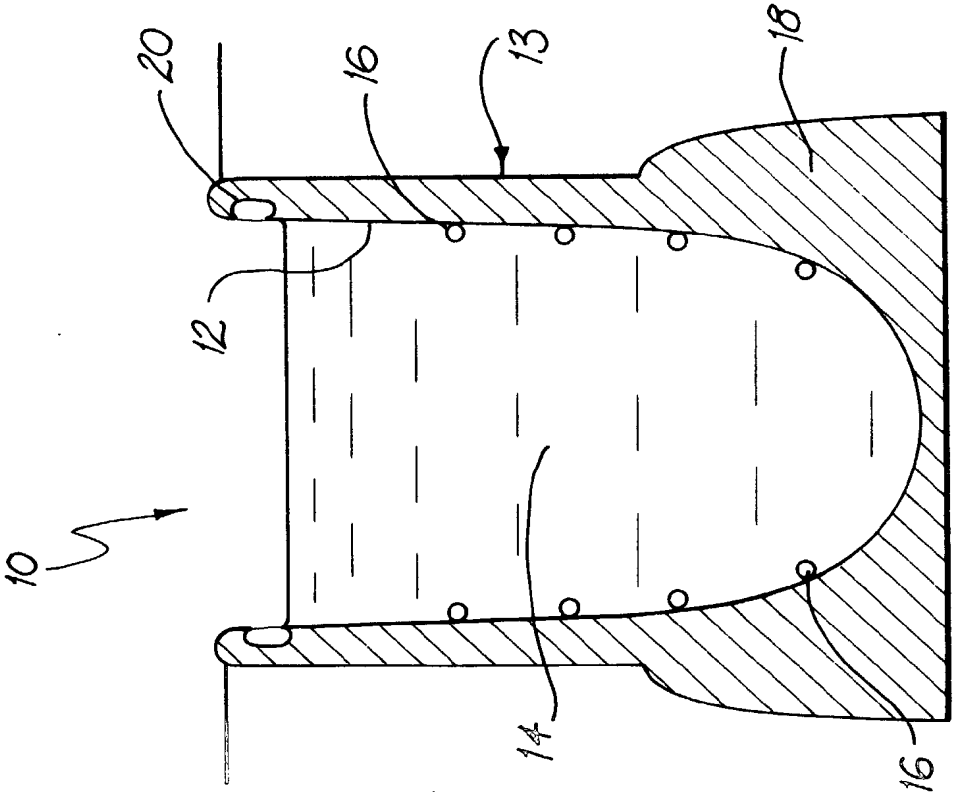


FIG. 1

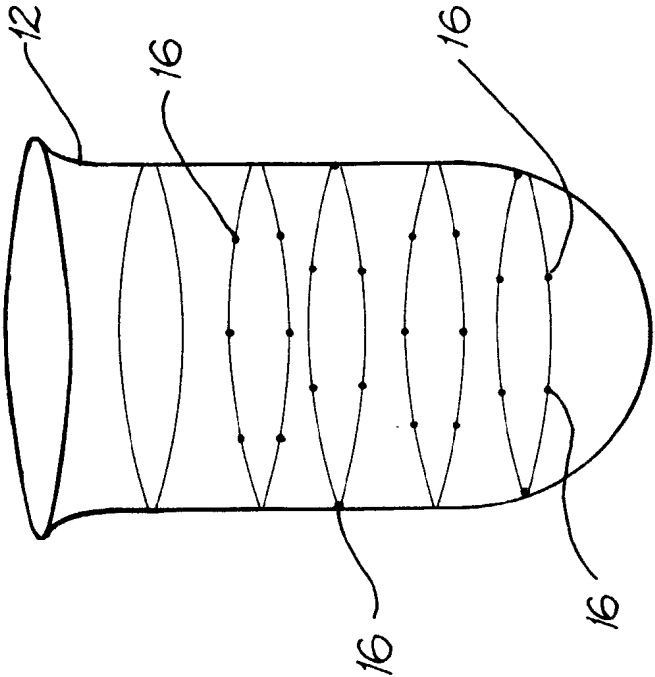


FIG. 2

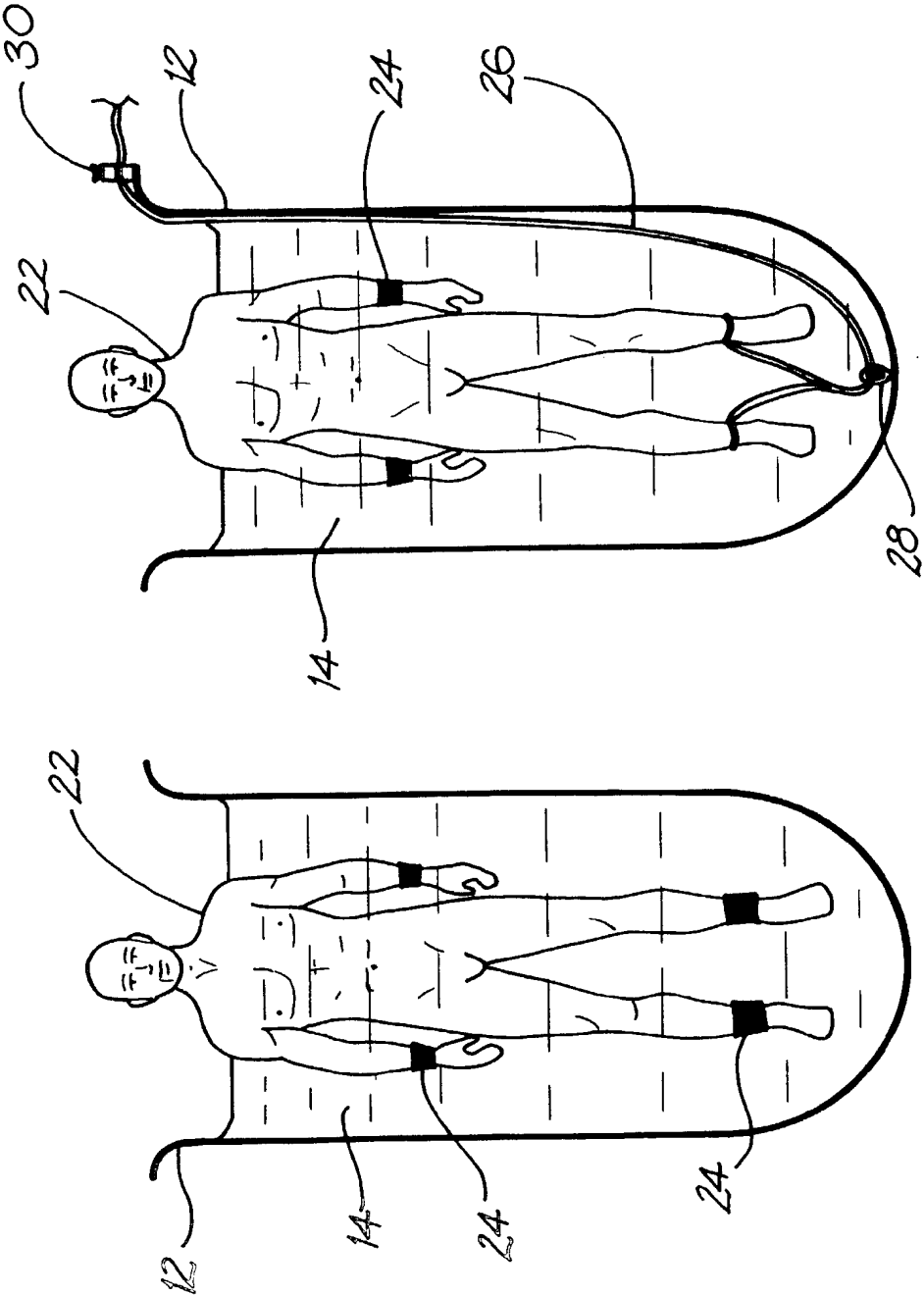


FIG. 4

FIG. 3

# INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/AU2005/000247**

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> Int. Cl. <sup>7</sup> : <b>A61H 9/00, 23/04</b> According to International Patent Classification (IPC) or to both national classification and IPC												
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) <b>DWPI: IPC A61H and keywords (lymph, hydraulic, water, liquid, agitate, vibrate, jet, therapy, massage, tank, reservoir, bath, spa, upright, stand, vertical) and similar terms</b>												
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>												
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.										
X	DE 19527770 C1 (WESTERHOFF) 12 June 1997 See figures 1 and 2	1-39										
X	WO 1991/001162 A1 (WEISZ) 7 February 1991 See entire document	1-39										
X	US 4443900 A (REMEYER) 24 April 1984 See figure 1, column 6, lines 21-66	1-39										
X	WO 1987/001584 A1 (WIKSTROM) 26 March 1987 See entire document	1-39										
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex												
* Special categories of cited documents: <table border="0"> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>"E" earlier application or patent but published on or after the international filing date</td> <td>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td>"&amp;" document member of the same patent family</td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	"P" document published prior to the international filing date but later than the priority date claimed	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention											
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone											
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art											
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family											
"P" document published prior to the international filing date but later than the priority date claimed												
Date of the actual completion of the international search <b>22 March 2005</b>		Date of mailing of the international search report <b>5 APR 2005</b>										
Name and mailing address of the ISA/AU <b>AUSTRALIAN PATENT OFFICE          PO BOX 200, WODEN ACT 2606, AUSTRALIA          E-mail address: pct@ipaustalia.gov.au          Facsimile No. (02) 6285 3929</b>		Authorized officer <b>A. ALI</b> Telephone No : (02) 6283 2607										

# INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/AU2005/000247**

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4181124 A (PAULETICH) 1 January 1980 See figure 1	1-39
X	EP 0154935 A2 (CONTI) 18 September 1985 See entire document	1-39



## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2005/000247

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member			
DE	19527770	NIL			
WO	1991/001162	AU	60470/90	CA	2064235
		US	5295929	EP	0591131
US	4443900	NIL			
WO	1987/001584	NIL			
US	4181124	NIL			
EP	0154935	AU	39838/85	BR	8501071
				ZA	8501603
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.					
END OF ANNEX					